Carbon Credits
for Methane Collection and Combustion

Introduction

Methane (CH_4) is one of the primary greenhouse gases (GHG) associated with global warming. The GHGs trap heat much like glass or a plastic cover in a greenhouse traps long-wave radiation emitted from the earth instead of releasing it to the outer atmosphere. Estimates of the impact on the earth's climate from human-driven changes in atmospheric GHG concentrations vary, but nearly all estimates predict some climate change. Methane is produced during anaerobic (without oxygen) digestion of organic material, such as digestion of animal waste in an anaerobic lagoon. The biogas released from an anaerobic lagoon is typically about 60 to 70 percent methane, with the remainder being mainly carbon dioxide (CO_2), which is also a GHG.

Projects that reduce methane emissions are eligible to earn marketable assets, generically called carbon credits, which represent the reduction in GHG emissions. Carbon credits are assets defined by a variety of voluntary specifications, as well as by national and international regulations. The carbon market comprises all carbon credits, and there are a variety of accounting registries that track the GHG assets. Trading occurs on several exchange platforms, including Chicago Climate Exchange and NYMEX Green Exchange.

One carbon credit usually represents the reduction of one metric ton of carbon dioxide or its equivalent in other greenhouse gases such as methane and nitrous oxide. Methane and nitrous oxide have approximately 21 times and 310 times, respectively, the heat-trapping capacity of carbon dioxide. Reducing methane by one ton is equivalent to reducing carbon dioxide by 21 tons. Concentrated animal feeding operations (CAFOs) offer good potential with current technology for capturing methane, and also combustion and energy use. Several factors should be considered in methane collection and utilization. (For example, see Biogas Anaerobic Digester Considerations for Swine Farms in North Carolina, N.C. Cooperative Extension AG-707).

Markets for Carbon Credits

The two types of markets for carbon credits are (1) compliance and (2) voluntary. Compliance markets have set a "cap and trade" system whereby the total annual emissions for an industry or country are capped by law or agreement, and carbon credits can be traded between businesses or sold in trading markets. Those producers who exceed their emission reductions can trade their credits to others in the marketplace who have not reached their emission goals. Voluntary markets exist for businesses or individuals to lower their "carbon footprint" by voluntarily purchasing carbon credits from an investment fund or company that has aggregated credits from individual projects that reduce emissions.

The compliance markets are mainly a result of the Kyoto Protocol, a cap and trade system that resulted from the international Framework Convention on Climate Change. The protocol was adopted at the 3rd Conference of the Parties in Kyoto, Japan, on December 11, 1997. The treaty required ratification by no less than 55 countries and enough industrialized countries to represent at least 55 percent of the total carbon dioxide emissions. Fifty-five countries agreed by May 23, 2002, but the 55 percent requirement was not met until Russia agreed on November 18, 2004. The treaty came into force 90 days later on February 15, 2005. As of May 2008, 182 countries had ratified the protocol.

Of these 182 countries, 36 developed countries (plus the European Union) are required to reduce greenhouse gas emissions to the levels specified in the treaty. The U.S. has not ratified the Kyoto Protocol. Brazil, China, India, and 134 other developing countries have ratified the protocol, but have no obligation beyond monitoring and reporting emissions. The Kyoto Protocol created specific rules for registering and certifying carbon credits. Carbon credit markets have been developing for several years, especially in Europe.

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